

# FAX TRANSMISSION

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Patent Number

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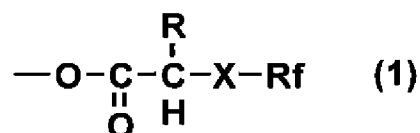
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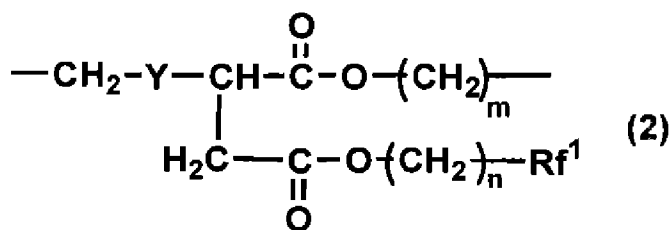
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10/579,773  
April 23, 2009**DRAFT LISTING OF CLAIMS**

Claim 1 (Currently Amended): A fluorine-containing photocurable composition containing a (meth)acrylate having a fluorinated alkyl group (A) and a photopolymerization initiator (B); wherein the (meth)acrylate (A) includes a functional group (A-i) represented by general formula (1) in which a fluorinated alkyl group is included at the terminal end thereof, and two or more (meth)acryloyl groups (A-ii), and the fluorine atom content in one molecule of the (meth)acrylate (A) is 25% by weight or more, and molecular weight of the (meth)acrylate (A) is 500 to 4000,



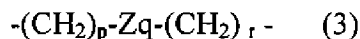
(~~in the general formula (1),~~ wherein R represents a hydrogen atom or alkyl group having 1 to 4 carbon atoms; X represents an alkylene chain, which may have a hetero atom, or a connecting group represented by the following general formula (2); and Rf represents a fluorinated alkyl group )



(~~in the formula (2),~~ wherein Y represents an oxygen atom or a sulfur atom; m and n are an integer of 1 to 4 which may be the same or different from each other; and Rf<sup>1</sup> is a fluorinated alkyl group).

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Claim 2 (Currently Amended): The fluorine-containing photocurable composition according to claim 1, wherein X in the general formula (1) is an alkylene chain represented by the following general formula (3),



~~(in the general formula (3), wherein Z represents -NR-SO<sub>2</sub>- (R represents a hydrogen atom or alkyl group having 1 to 24 carbon atoms) or a sulfur atom, an oxygen atom, or nitrogen atom which has a hydrogen atom or alkyl group having 1 to 24 carbons; p represents an integer of 0 to 4; q represents 0 or 1; r represents an integer of 0 to 20; and 1 ≤ p+r ≤ 20).~~

Claim 3 (Currently Amended): The fluorine-containing photocurable composition according to claim 1, wherein X in the general formula (1) is an alkylene chain represented by the general formula (3) ~~-(wherein Z represents -NR-SO<sub>2</sub>- (R represents a hydrogen atom or alkyl group having 1 to 24 carbon atoms) or a sulfur atom an oxygen atom, or a nitrogen atom which has a hydrogen atom or alkyl group having 1 to 24 carbons; p represents 1; q represents 1; and r represents an integer of 0 to 19); or a connecting group represented by the general formula (2) (~~ wherein R<sup>f</sup> represents -C<sub>n</sub>F<sub>2n+1</sub> (n represents an integer of 1 to 20); and R<sub>f</sub> in the general formula (1) represents -C<sub>n</sub>F<sub>2n+1</sub> (n represents an integer of 1 to 20) which may be the same as or different from the R<sup>f</sup>.

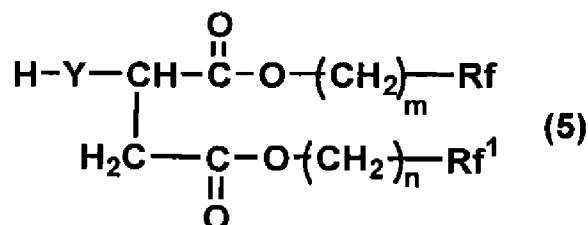
Claim 4 (Currently Amended): The fluorine-containing photocurable composition according to claim 3, wherein X in the general formula (1) is an alkylene chain represented by the general formula (3) ~~-(Z represents -NR-SO<sub>2</sub>- (R represents an alkyl group having 1 to 6 carbon atoms), a sulfur atom or a nitrogen atom or a connecting group represented by the general formula (2) (~~ Y represents a sulfur atom, and the carbon number n of R<sup>f</sup> is 4, 6 or 8); and the carbon number n of R<sub>f</sub> in the general formula (1) is 4, 6 or 8.

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Claim 5 (Currently Amended): The fluorine-containing photocurable composition according to claim 1, wherein the (meth)acrylate having a fluorinated alkyl group (A) is a compound which is obtained by reacting a compound (a1) containing three or more (meth)acryloyl groups with a compound represented by the general formula (4), or by reacting a compound (a1) containing three or more (meth)acryloyl groups with a compound (a2) represented by the general formula (5) such that the compound (a2) is used in an amount of 0.01 to (k-2) mole (wherein k represents the average number of (meth)acryloyl groups included in one molecule of the compound (a) ) with respect to 1 mole of the compound (a1),



~~(in the general formula (4), wherein~~ wherein ~~r represents an integer of 0 to 20; Rf represents -C<sub>n</sub>F<sub>2n+1</sub> (n represents an integer of 1 to 20); and Z represents -SO<sub>2</sub>-NR- (R represents a hydrogen atom or an alkyl group having 1 to 24 carbon atoms) or a sulfur atom, oxygen atom, or nitrogen atom which has a hydrogen atom or alkyl group having 1 to 24 carbon atoms )~~

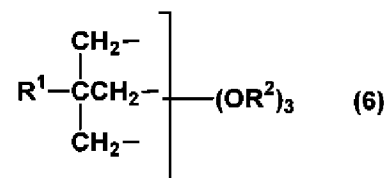


~~(in the general formula (5), wherein~~ wherein ~~Y represents an oxygen atom or a sulfur atom; m and n are an integer of 1 to 4 which may be differ from or the same as each other; and Rf and Rf<sup>1</sup> represent -C<sub>n</sub>F<sub>2n+1</sub> (n represents an integer of 1 to 20[.]) which may be different from or the same as each other).~~

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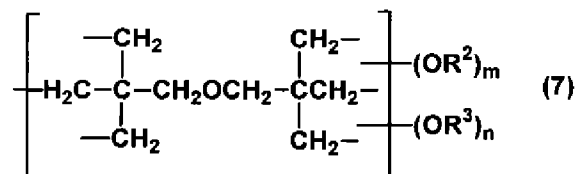
Claim 6 (Original): The fluorine-containing photocurable composition according to claim 5, wherein the compound (a2) is a compound represented by the general formula (4) (Z represents -SO<sub>2</sub>-NR- (R represents an alkyl group having 1 to 6 carbon atoms) or a sulfur atom, or nitrogen atom which has a hydrogen atom or alkyl group having 1 to 6 carbon atoms and carbon number n in R<sub>f</sub> is 4, 6, or 8), or a compound represented by the general formula (5) (Y represents a sulfur atom, and the carbon number n in R<sub>f</sub> and R<sub>f1</sub> is 4, 6, or 8).

Claim 7 (Currently Amended): The fluorine-containing photocurable composition according to claim 5 or 6, wherein the compound (a1) containing three or more (meth)acryloyl groups is at least one selected from the group consisting of: a compound (a1-1) represented by the general formula (6), a compound (a1-2) represented by the general formula (7), a urethane (meth)acrylate (a1-3), a cyanurate ring-containing tri(meth)acrylate (a1-4), and a phosphoric acid tri(meth)acrylate (a1-5),



(in the general formula (6), wherein R<sup>1</sup> represents a hydroxyl group, an alkyl group having 1 to 24 carbon atoms, an alkyl carbonyloxy group having 1 to 24 carbon atoms, CH<sub>2</sub>=CHCO<sub>2</sub>CH<sub>2</sub>-, CH<sub>2</sub>=C(CH<sub>3</sub>)CO<sub>2</sub>CH<sub>2</sub>-, a (poly)oxyalkylene group, wherein the number of repeating units is one or more and terminal end thereof is blocked with a hydrogen atom or alkyl group having 1 to 18 carbon atoms, or an alkylol group having 1 to 12 carbon atoms; and R<sup>2</sup> represents an (meth)acryloyl group)

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(in the general formula, wherein  $\text{R}^2$  represents a (meth)acryloyl group;  $\text{R}^3$  represents a hydrogen atom or alkyl carbonyl group having 1 to 18 carbon atoms;  $m$  represents an integer of 3 to 6  $n$  represents an integer of 0 to 3; and  $m + n = 6$ ).

Claim 8 (Original): The fluorine-containing photocurable composition according to claim 7, wherein the compound (a1) containing three or more (meth)acryloyl groups is a compound represented by the general formula (6) (wherein,  $\text{R}^1$  represents a straight chain alkyl group having 1 to 4 carbon atoms,  $\text{CH}_2=\text{CHCO}_2\text{CH}_2\text{---}$ ,  $\text{CH}_2=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_2\text{---}$ , or alkylol group having 1 to 3 carbon atoms), a compound represented by the general formula (7) (wherein,  $\text{R}^3$  represents a hydrogen atom or alkyl carbonyl group having 1 to 12 carbon atoms), or urethane (meth)acrylate which can be obtained by reacting a hydroxyl group-containing (meth)acrylate (x1) which has two or more (meth)acryloyl groups and an isocyanate compound (x2) which has an alicyclic structure.

### **CLAIM SUPPORT**

Examples, which correspond to compounds represented by the general formulas (6) and (7) of Claim 7, are shown on pages 15 to 19 of the present specification.

As shown in lines 8 to 10 on page 14 of the present specification, there is a recitation that:

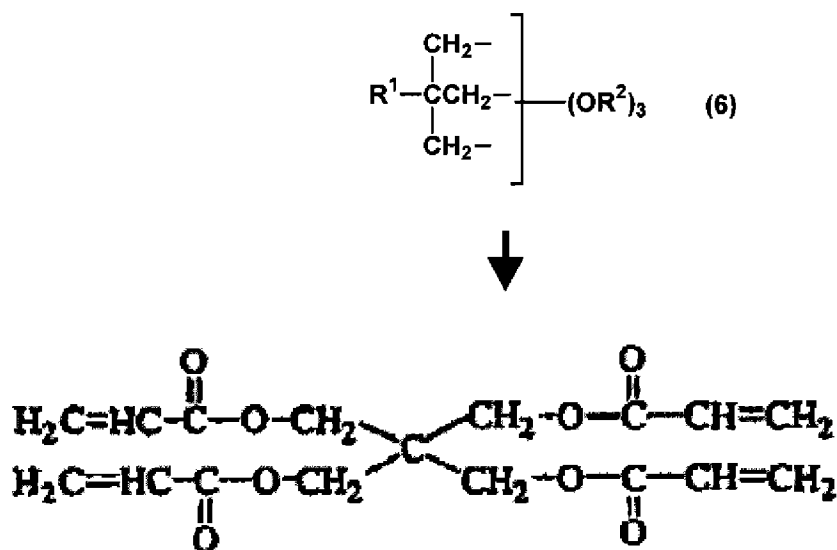
Here, the following examples are examples for acrylate, and each acryloyl group in the following examples may be replaced with a methacryloyl group.

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Accordingly, an acryloyl group of the compounds on pages 15 to 19 of the present specification may be changed to a methacryloyl group. Furthermore, please refer to Synthetic Examples 3 and 5 of the present specification. Trimethylol propane trimethacrylate, which is a compound having a methacryloyl group, is used.

In addition, concrete examples of the compound (a1-1) represented by the general formula (5) and the compound (a1-2) represented by the general formula (7) are shown below. The compounds show that Claims 7 and 8 are supported concretely by the present specification.

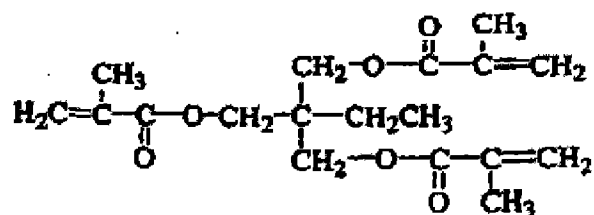
**[Concrete examples of the compound (a1-1) represented by the general formula (6)]**



(i) Pentaerythritol tetraacrylate

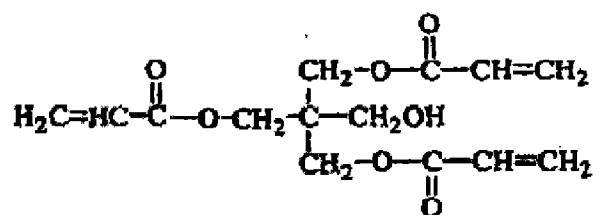
(Synthetic Examples 2 and 7, and the description on page 23 of the present specification)

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(ii) Trimethylol propane trimethacrylate

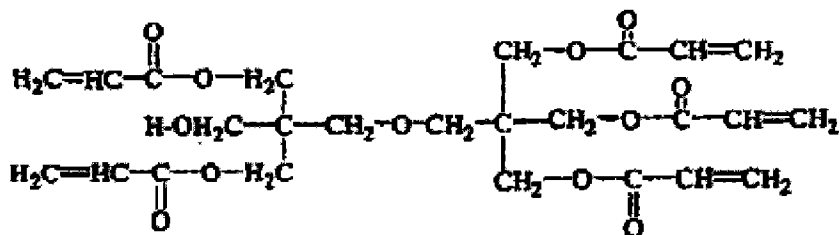
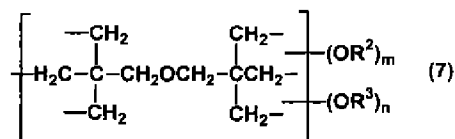
(Synthetic Examples 3 and 5 of the present specification)



(iii) Pentaerythritol triacrylate

(Synthetic Example 4 and description on page 22 of the present specification)

[Concrete examples of the compound (a1-2) represented by the general formula (7)]

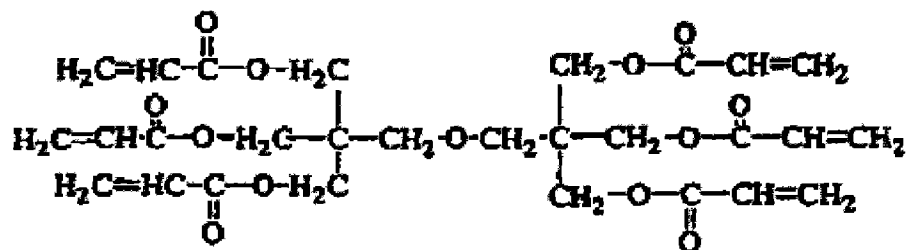


(i) Dipentaerythritol hydroxypentaacrylate

(Synthetic Examples 10 and 11 and description on page 23 of the present specification)



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(ii) Dipentaerythritol hexaacrylate

(Synthetic Example 12 and description on page 23 of the present specification)